



LORAIN COUNTY ENGINEER

KEN CARNEY, P.E., P.S.

May 22, 2023

Lorain County Board of Commissioners
226 Middle Avenue
Elyria, Ohio 44035

Attn: Theresa Upton, Clerk tupton@loraincounty.us, ehawkins@loraincounty.us

Re: Preliminary Report of **Roth Main Ditch & Lateral #1 Restoration**, Columbia Twp.

Board of Commissioners:

The County Engineer hereby estimates the costs to construct the petitioned improvement at about \$998,500 (see the preliminary engineer's estimate at the end of this report). In County Engineer's opinion, this project is feasible; its benefits are likely to exceed its estimated cost; it is necessary for the disposal of surplus water; and it is conducive to the public welfare.

Project Description

The County Engineer proposes to restore, clean and reconstruct the drainage system that runs east from Mitchell Road by excavating, deepening and shaping the ditch, (that is, by laying-back and re-vegetating the banks of the ditch), removing obstructions such as sediment, trees and vegetation, and altering damaged and undersized drains in order to restore adequate drainage; and to provide access within a new easement for County maintenance in accordance with ORC 6137.06.

By providing an adequate outlet, this improvement will better drain the 133 acres of agricultural and residential land on Mitchell and Osborne Roads. The drainage improvements will benefit one farm in the area, and about sixteen houses on both sides of Mitchell Road including some houses and a barn on the north side of Osborne Road.

The map of the Benefitted Lands Map found on the next page indicates the location of the proposed drainage improvement drawn with the blue colored line, within the 133-acre neighborhood area that benefits, as outlined in purple color:

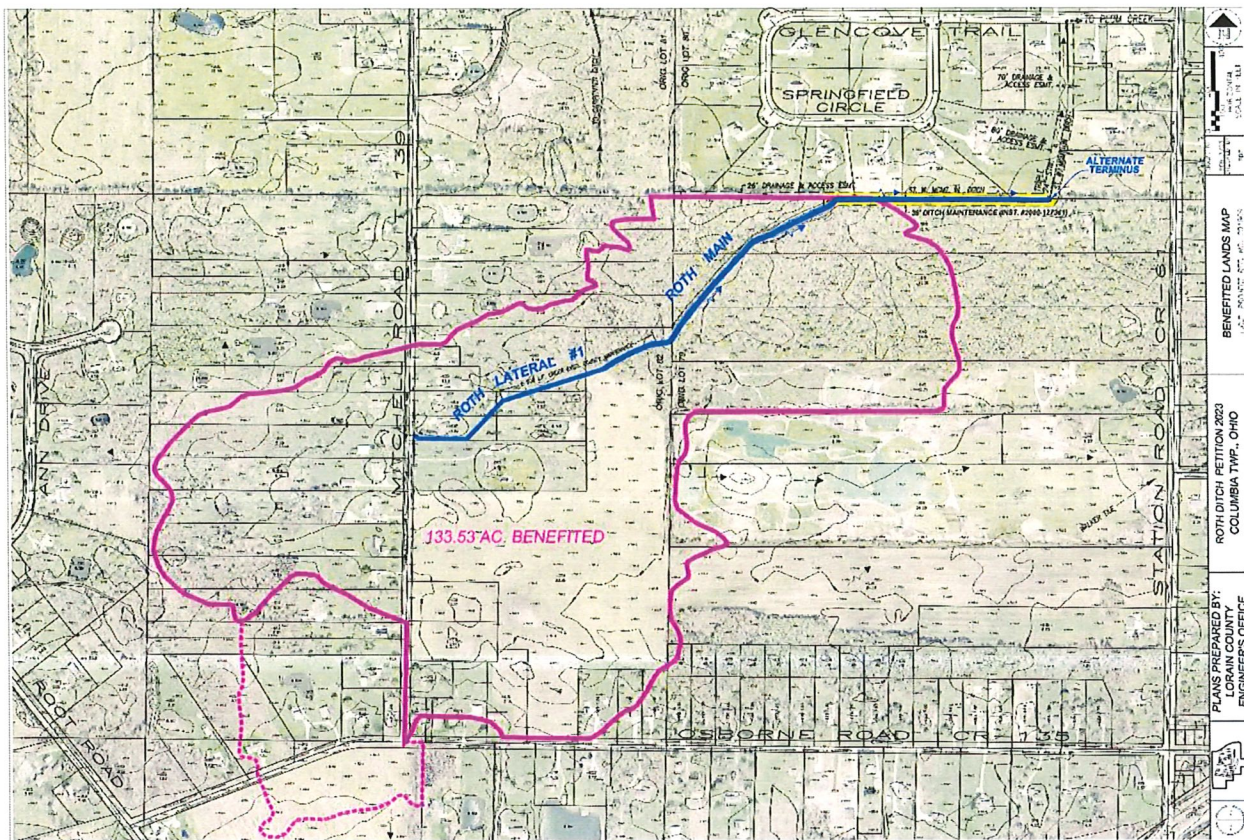


Figure 1. Map showing the lands to be benefitted by the Roth Main Ditch & Lateral #1 Restoration improvement, with the Engineer's recommended alternate terminus in yellow highlight at the upper right.

Route and Termini

The proposed route of the new drainage improvement begins by following the route of the Lateral along the existing pipe (or "tile") as it runs eastward from Mitchell Road, and then as it turns to run northeasterly, and eventually opens into the Roth Main Ditch that continues to run in the existing ditch-shaped in-line storm water management basin that is located behind the houses off the south side of Springfield Circle.

This receiving stream is an otherwise adequate drainage outlet for the proposed improvement--except that upon further investigation, it was found to be too shallow and therefore must be deepened to provide a truly adequate outlet. Therefore, the County Engineer now proposes and recommends that the east terminus of this project be extended further east from that as originally petitioned. This recommendation will provide an adequate drainage outlet.

In accordance with ORC 6131.09.B, the County Engineer recommends this "alternate" proposal to the original petition in order to accomplish the intent of the petition.

More specifically, the route of the recommended drainage improvement is located in Original Lot Nos. 79, 80 & 82 of Columbia Township, Lorain County, Ohio; and it commences in Mitchell Road about 0.3 mile north of Osborne Road; then runs east, then northeast about 0.5 mile to the north line of said Columbia Township Lot No. 79 which is also the south line of Stone Ridge Estates Subdivision as recorded in Volume 90, Page 16 of Lorain County Plat records; then continues east along the subdivision line about 0.2 mile to its alternate terminus, as depicted on the map above.

The additional properties that are adjacent to the proposed alternate improvement are listed here:

List of Alternate Properties Impacted by Ditch Improvement
Lorain County Ditch Petition
Maller
Roth Ditch Petition

Date : March 3, 2023

	Owner's Name	Owner's Address	Permanent Parcel number	Township
1	Kevin Kennedy	10620 Station Road Columbia Station, Ohio 44028	12-00-079-000-050	Columbia
2	Mark A. & Andrea M. Heinrich	26776 Springfield Circle Columbia Station, Ohio 44028	12-00-080-000-062	Columbia
3	Sequan M. & Jennifer Gebble	26778 Springfield Circle Columbia Station, Ohio 44028	12-00-080-000-063	Columbia
4	Derek M. & Kelly M. Baumgartner	26780 Springfield Circle Columbia Station, Ohio 44028	12-00-080-000-064	Columbia
5	Jonathan D. Umbel & Chessy S. Umbel, Trustees	26782 Springfield Circle Columbia Station, Ohio 44028	12-00-080-000-065	Columbia
6	Vikki L. Klingenberg	8546 Wedgewood Court Olmsted Falls, Ohio 44138	12-00-080-000-076	Columbia
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List of Factors both Favorable and Unfavorable

1. An extensive public improvement is necessary for the disposal of surplus water. Prior piecemeal efforts now perform unsatisfactorily, so the storm water infrastructure should be upgraded at this time.
2. The most recent reconstruction effort in 2009 to restore this drainage course has proved to be unsatisfactory (in part because of insufficient scope and funding constraints at that time). Evidently, the size of that pipe was decreased in 2009 to save money during the time of the “Great Recession.” The 2009 improvement continues to suffer from lack of proper access for maintenance.
3. This ditch requires cleaning, shaping and deepening to restore its drainage capacity function, and to thereby reduce the risk of flood damage.
4. This drainage improvement will excavate accumulated ditch sediments, and will establish a uniform hydraulic flow line, to provide an adequate drainage outlet for the local storm water conveyance system.
5. This improvement will shape the ditch with safe, stable and erosion-resistant banks that are properly constructed and maintained at a maximum 2:1 slope.
6. Inadequate drain pipes now run through portions of the drainage system, and should be reconstructed and upgraded to adequate sizes and slopes. The County Engineer recommends to remove and replace the existing drains because they are substandard or otherwise inadequate.
7. This improvement will restore the drainage outlet for the roadway culvert under Mitchell Road, and consequently will restore the outlet for open and enclosed roadside ditches. Additionally, the travelling public will benefit from the reduced risk of flooding onto, and damage of, the roadway pavement itself.
8. The new improvement will enjoy an enhanced drainage outlet that is located at Glencove Trail near Station Road. The County Engineer now maintains this ditch-shaped elongated “dry” storm water management basin (sometimes referred to as a “detention ditch”) in a permanent maintenance easement—see the photograph that appears at the top of the following page. The open ditches and adequate storm sewers continue another mile further eastward to their ultimate outfall into Plum Creek near Jaycox Road.



↑ Existing ditch route along the south line of Stone Ridge Estates Subdivision

9. Preliminary engineering analysis indicates the need to deepen the pictured portion of the ditch as part of this improvement, however. In fact, the recommended deepening will restore the flow line to match the original depth of the Roth Tile that was installed there in 1917. This will provide for an improved hydraulic gradient upstream all the way to Mitchell Road. The amount of deepening will be determined by final engineering, and will be based upon completed topographic surveying. The County Engineer proposes this “alternate” to the original petition in order to provide an adequate drainage outlet. The recommended route is visible in the above photograph, with the alternate terminus in the distance (see also Page 16 for a close-up photo at the location of the terminus).

Deepening this ditch will not adversely impact the drainage of the subdivision. It will increase the capacity of the subdivision’s existing storm water management facility, and will thereby afford further flood protection to the adjacent properties. Therefore, the effect on adjacent lands and lands below the terminus is expected to be positive.

10. This improvement will reduce the risk of flooding of the basements of several houses, portions of low-lying yards and private driveways especially along Mitchell Road (a township public road) and farm land, as appears on the preceding map of the 133 acres of benefitted lands. See also representative photos of flooding Pages 11 and 12 in the Current Conditions section of this report. All the land in this area of Columbia Township lies in its low-density rural residential zone.

11. This drainage improvement will relieve the outfalls of about one dozen home septic sewage treatment systems (HSTS) on Mitchell Road that are tributary to the existing drainage system, and thus will benefit from this drainage improvement. All these houses rely upon residential septic HSTS, none of which are expected to function properly under poor drainage conditions.

The County Sanitary Engineer reports that an E. coli bacteria test was high enough in the effluent sampled in the catch basin at Mitchell Road to suggest the existence of a public health nuisance. Stressed home sewage systems often contribute to this type of problem.

The County Sanitary Engineer further reports that there is no sanitary sewer service now on Mitchell Road, nor are there any plans for sanitary sewer extensions down Sprague Road.

12. Portions of the enclosed ditch should be "daylighted" by removing inadequate tile, and excavating a new open channel (where it is practical). This process is known as "daylighting" the ditch. The County Storm Water Management District recognizes the benefits of open channels especially for economy, superior hydraulic and runoff water storage capacity, and enhanced environmental water quality.

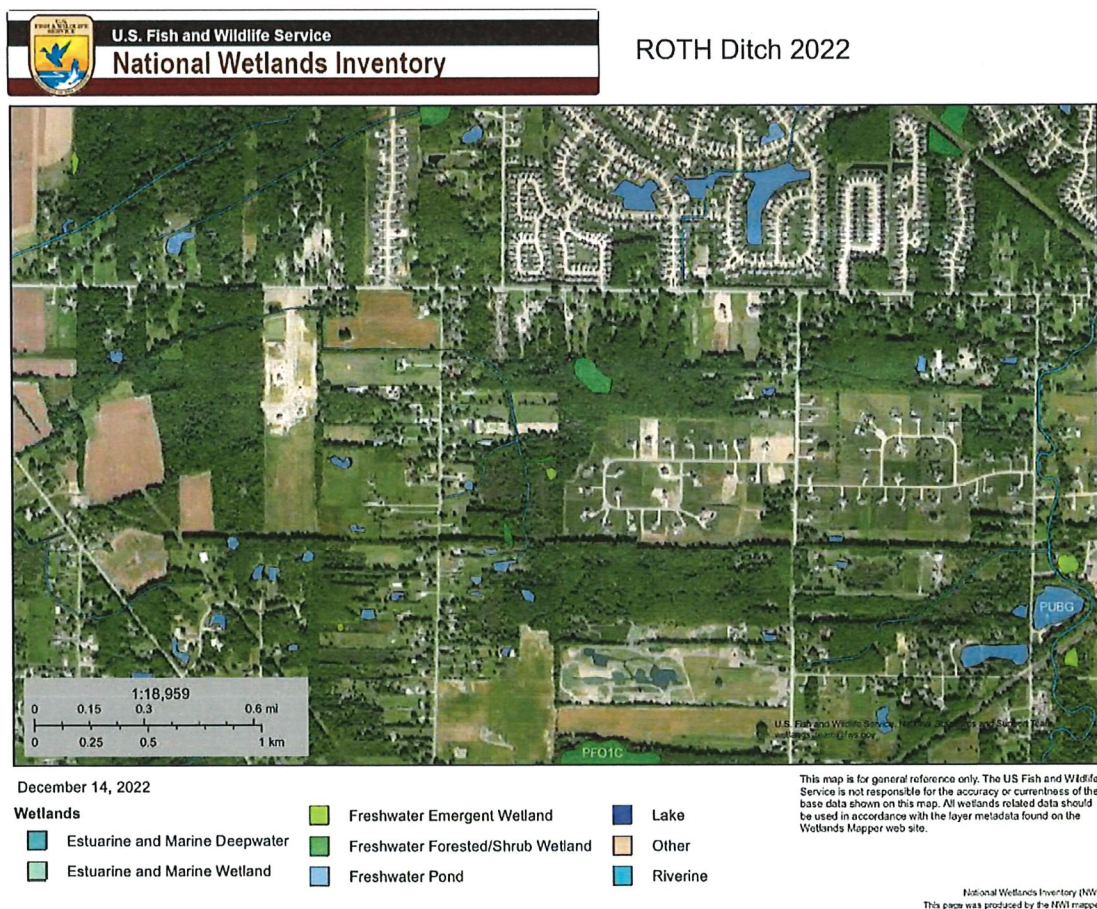
13. Hydraulically, the existing flow line gradient in the upstream reaches of the ditch is very flat (about 0.1%). In fact, the topography of this watershed is rather flat and difficult to drain (the watershed is tributary to Plum Creek and Rocky River to the east). These factors contribute to the existing ditch's very sluggish flow regime, and would continue to influence any improvements; however, the County Engineer's proposed alternate will increase the gradient of the improved ditch or drain throughout the upstream reach where the need is greatest.

14. Some portions of the open ditch may be candidates for the two-stage (pilot channel) ditch design that is promulgated by H2Ohio and others. This may also partially ameliorate the sluggish flow problem. Less excavation may thus also offer a slightly more cost-effective ditch cross-section. Additional engineering with topographic mapping will properly evaluate these and other design selections.

15. Water quality will improve because of the environmental benefits that are associated with properly engineered open channels such as: stabilized vegetated banks, longer flow residence time, reduced export of nutrients and sediment, and reduced erosive flow velocity.

16. Wetlands and environmentally significant areas will either be avoided, or will not be adversely impacted by this improvement. No wetlands will be removed. Ditch excavation will comply with the U.S. Army Corps of Engineers “one-step” method; and construction operations will be conducted from timber mat platforms and by other approved methods, where necessary.

17. Further analysis of wetlands and environmental constraints may substantially impact the costs estimated in this report. Although the National Wetlands Inventory Map (see map below) does not indicate significant conflicts, further environmental investigation will be necessary. Additional costs may include the need for consultants, US Army Corps of Engineers or Ohio EPA permits, costs associated with additional construction requirements, mitigation costs, etc.



18. No additional impervious surface area will result from this project.

19. This improvement will establish permanent vegetated filter strip buffers that protect water quality by removing sediment, contaminants, and suspended solids from overland flow coming from adjacent land, including some cultivated agricultural land.

20. Best management practices for temporary and permanent erosion controls will be employed before, during and after construction.

21. A corridor of trees and brush must be cleared across agricultural land and residential yards for the purpose of access for construction, as well as access for future maintenance. The ground surface of the corridor will be restored, and will be re-vegetated with grass.

22. This improvement will create a permanent ditch maintenance easement that will facilitate on-going inspection and maintenance by the County. Perpetual maintenance within permanent easements are statutory requirements per ORC 6131.

23. The easement will encompass the ditch and drain, plus an unobstructed grass access lane along one side, for a total width of about 3,750 feet, and total length of about 2,600 feet. The easement will encumber these parcels of land: 1200079000048, 1200079000050, 1200079000051, 1200080000062, 1200080000063, 1200080000064, 1200080000065, 1200080000076, 1200082000045, 1200082000050, 1200082000055, 1200082000056, 1200082000058, and 1200082000074.

24. The County Engineer estimates all damages at \$0. The County Engineer estimates that as a result of this improvement and subsequent maintenance thereof, the benefits of this project (including providing a drainage outlet for runoff flow from cultivated and urbanized uplands, reduction of damage from flooding, removal of water that jeopardizes public health, safety or welfare, storage, management and regulation of stream flow, increased value and productivity of land, soil conservation and environmental enhancements, and other benefits) will fully offset all potential damages.

Current conditions

The following comments and photographs describe and depict the current conditions along the route of the proposed improvement, starting at Mitchell Road, then running downstream (northeasterly) about 3,750 LF.

- A. The first leg of the 12-inch "tile" runs 0.1 mile eastward from Mitchell Road (a township road), where it is fed by several other storm sewers that drain the roadside plus land west of Mitchell Road. The several storm drain pipes and the 24" roadway culvert are pictured converging inside the catch basin at #10955 Mitchell Rd:



This first leg is privately owned--it is not under County maintenance, and it lies mostly under the Smith property at 10955 Mitchell Rd (photos show Smith's front & backyard):





↑ This run of (underground) pipe reportedly is composed of single-wall corrugated HDPE material, which is considered to be substandard pipe material for this application. It is also prone to maintenance problems, especially from intrusion by tree roots, or from poor alignment. The County Engineer successfully sewer-jetted a blockage in 2018, but could not succeed in removing a subsequent blockage in 2020. Smith, the homeowner, reportedly repaired at least one collapsed pipe section in 2022, and more recently he observed another sinkhole develop over the pipe.

Smith and others have reported significant basement flood damage (including structural damage) at #10955 and #10934 Mitchell Road.

This run of pipe appears to drain very slowly, and adjacent yards often exhibit standing water for several days after heavy rains, as visible in the following photographs:



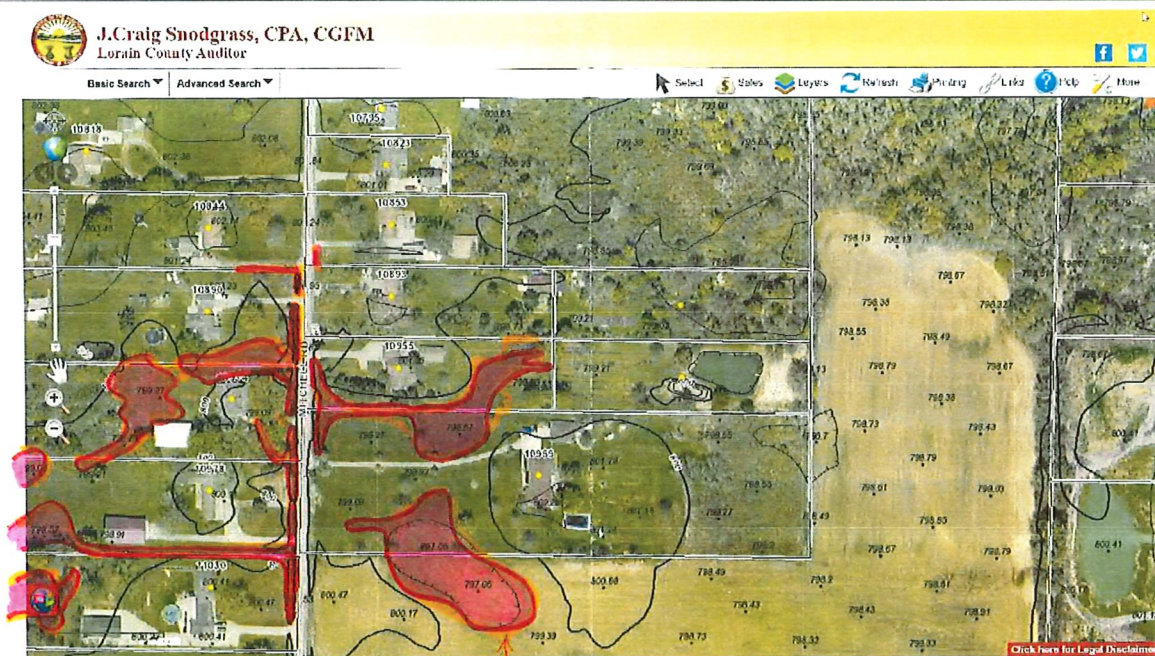
Standing water in the front yards and roadside of #10955 ↑, and #10969 ↓ Mitchell Rd.



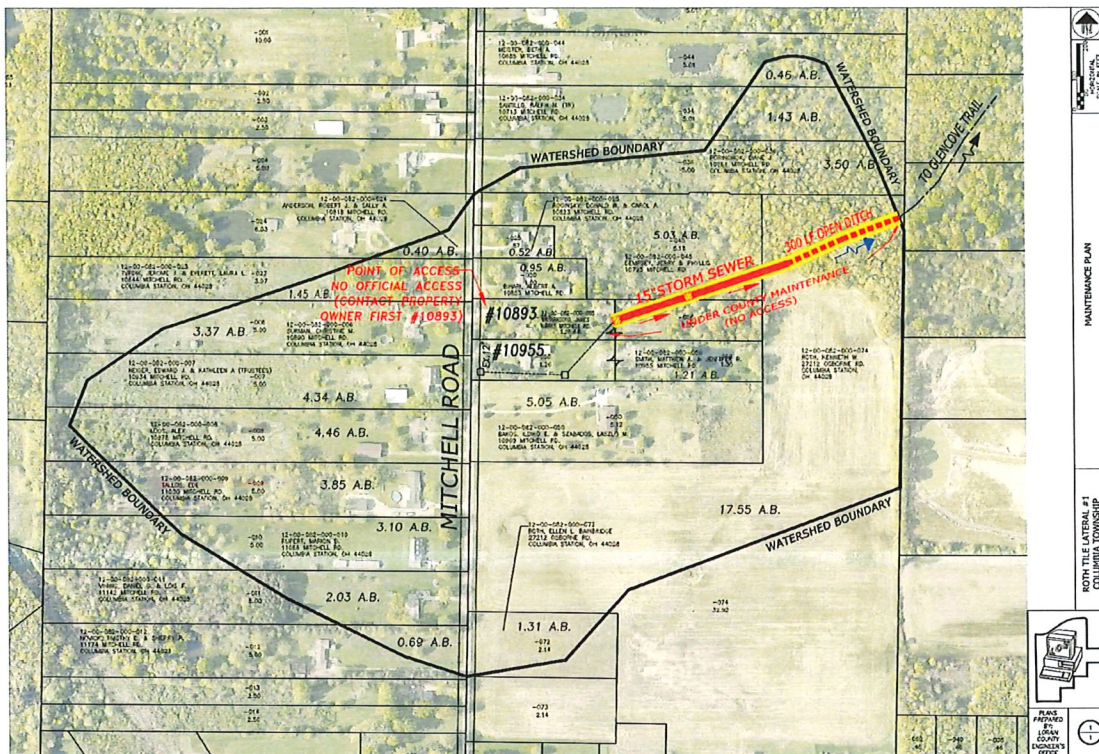
Standing water in the front yards and roadside ditch at #10934-10890 Mitchell Rd.↓



Areas of standing water on flooded farm and yards in Spring 2022 are visible in the aerial image of the neighborhood, and are highlighted in red below ↓



B. The County is currently charged with the maintenance of the next 0.15 mile of the "Roth Tile Lateral Improvement" downstream as shown here in yellow and red colors:



The County's maintenance consists of the 15" diameter double-wall storm drain pipe. The catch basins in the rear of #10893 Mitchell Road is pictured below. The 15" pipe extends underground through the brush at the upper right of this photograph ↓



However, this run of pipe suffers from poor access, and may also suffer from inadequate size, depth and flat gradient. Its poor outfall into the shallow standing water of the open ditch is pictured next. This run of pipe, installed in 2009, otherwise remains in good structural condition ↓



Significantly, this short County-maintained ditch reach suffers from no access at all—it is landlocked. This recent improvement (also part of the 2009 installation) established no formal access route—which greatly inhibits current maintenance efforts. The following photo looking toward the open ditch on the Roth farm property depicts part of this landlocked ditch area ↓



- C. The next downstream reach consists of the open ditch that flows through several wooded parcels of land for about 0.25 mile. This wide ditch appears to have been constructed or widened or cleaned in modern times (perhaps about 25 years ago), by unknown parties. Evidently, no one currently maintains this reach, however. Large woody debris in the channel partially obstruct the flow, and contribute to about one foot of standing water in the ditch. An undetermined amount of sediment is visible in the bottom of the channel. Trees have grown up along both sides of the ditch, including growing on top of the spoil piles that were cast along its northwest side ↓.



Hydraulically, the flow line gradient in this reach of the ditch is very flat (the topography of the entire watershed is very flat). All these factors contribute to the ditch's very sluggish flow regime. On the following page, see more photos of this reach of the ditch:



↑The existing ditch is wide, but has little fall (or gradient), and has plenty of standing water.

Sinkholes and remnants of the old 22" clay (Roth) tile are sometimes visible alongside the ditch ↓ This condition illustrates the need for deepening the next run of the ditch:





↑ The existing ditch turns east at the south line of Stone Ridge Estates Subdivision

D. The final reach consists of the ditch as it continues to run along the south line of Stone Ridge Estates Subdivision, to its terminus pictured below where the ditch turns north and enters these triple 24" culverts:

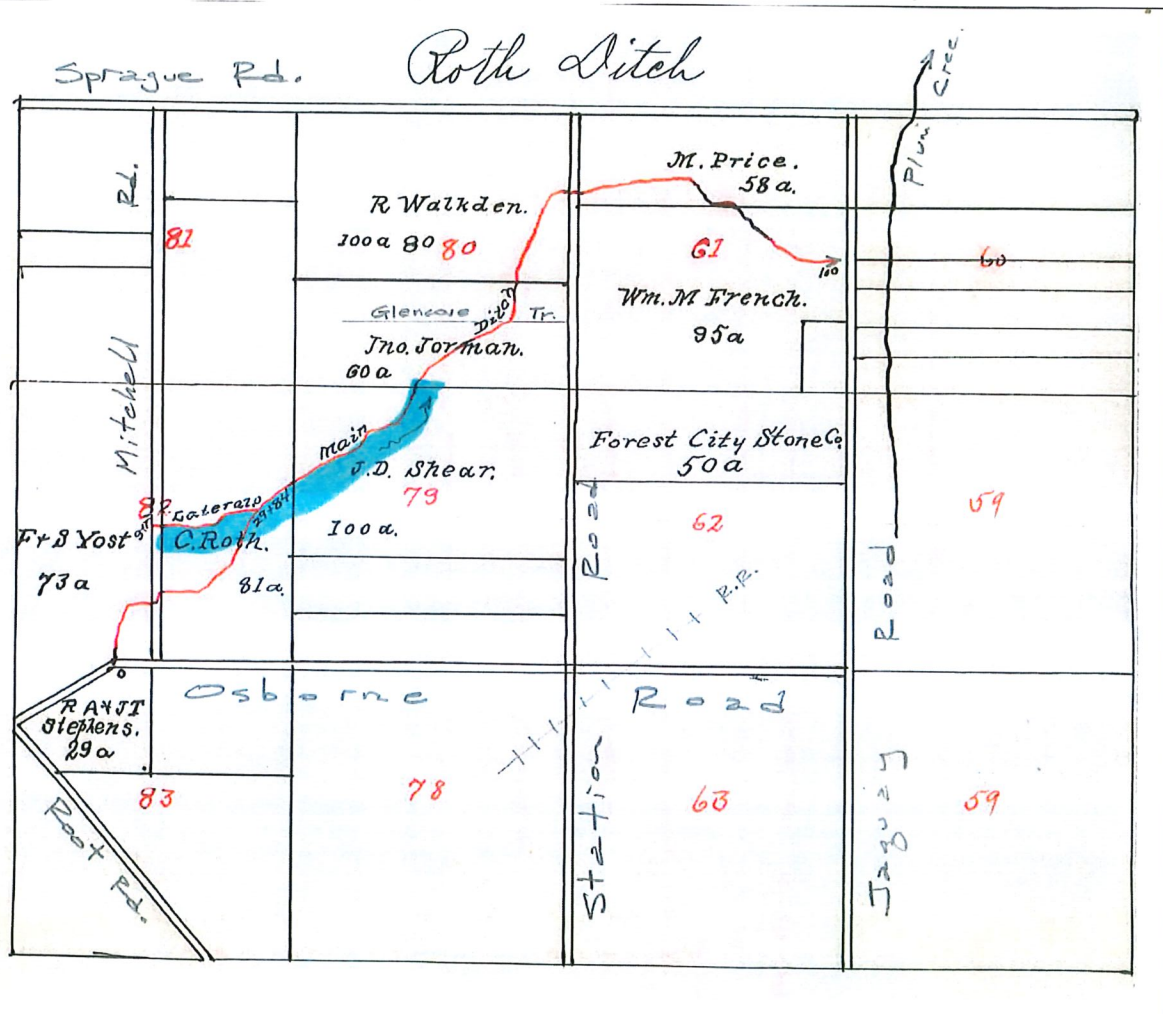


History

The Roth Ditch watershed consists of land that generally drains northeast to Plum Creek. The natural ground surface of the land is nearly flat and is therefore poorly drained. Today, rural suburban houses, farms, and public roads occupy the land in this watershed area.

In 1898 and 1904, the County was petitioned and did establish "Roth Ditch." The old map below indicates both the "Main" ditch and its "Lateral." Later in 1917, the County constructed more petitioned improvements that consisted of "tiling" those ditches. No ongoing maintenance by the County was provided for at any of those times, however.

The current petition scope is superimposed in blue color on the old map for reference:



As the result of a subsequent petition, in 2009 the County constructed and placed on maintenance the landlocked improvement that replaced a portion of the storm drain pipe and open ditch that is known as the "Roth Tile Lateral Improvement." This is the same improvement described on Pages 13-14 of this report.

Engineer's Preliminary Estimate of Cost

For preliminary or budget purposes, the total ditch restoration project may be estimated at about \$998,500 broken down by major components as follows:

A. Alternate: deepen ditch outlet along subdivision	1,000 LF @ \$ 50	= \$ 50,000
B. Excavate existing ditch through woods	1,500 LF @ \$150	= \$ 225,000
C. Allowance for timber mats in possible wetlands	1,500 LF @ \$100	= \$ 150,000
D. Replace existing drain pipes east of Station Rd.	1,100 LF @ \$250	= \$ 275,000
E. Construction 10% contingency		<u>\$ 70,000</u>
	Construction hard cost subtotal	\$ 770,000
F. One year of maintenance per ORC 6131.15.B.1 @ 5%		\$ 38,500
G. Project soft costs estimated @ 25%		\$ 190,000
H. Damages estimated		<u>\$ 0</u>
	Project Total	\$ 998,500

Peter Zwick PE PS
Chief Deputy Engineer



cc: Ken Carney PE PS, Lorain County Engineer
Don Romancak Lorain County SWMD Coordinator romancakd@loraincounty.us